

# THE VIEW FROM HUFFMAN PRAIRIE—THE WRIGHTS AND THEIR FLYING MACHINE

A small herd of black and white cows and two brown plow horses standing in a small lot gazed across the barbed wire fence and regarded with mild concern the odd contraption nestled outside a small shed. The machine was too large to be a corn planter. Although steam-driven agricultural equipment often had small canvas covers to shade operators, this strange machine had two huge canvas covers on its body, at some distance from the ground. Moreover, the thing had an odd-looking beak and a ridiculous twin tail. Its claws seemed to be missing. In general profile the machine resembled a big bird—many times larger than the familiar chicken hawk.

As the animals watched, two men came from the open end of the shed where they had been awaiting the passage of a brief but heavy thundershower. The rain had lowered the temperature to 81° F, but the humidity remained at 66 percent. Swarms of mosquitoes and horseflies taunted and tormented their targets.

It was early afternoon, May 26, 1904. Despite the heat and humidity each man was dressed for business, in heavy, high-top, laced leather shoes; dark wool trousers; a white, long-sleeved shirt with a high, stiff collar; a vest; and a bow tie. One wore a derby. The other sported a cap. Turning his

visor rakishly to the rear, 33-year-old Orville Wright wedged his lean body into a prone position in the V-shaped cradle on the white, muslin-covered lower wing of a 700-pound biplane. He lay well forward of the leading edge of the wing, with his face about 36 inches above the ground. His shoes pushed against a footrest on the trailing edge of the left wing. He held tightly to the leading edge of the wing with his right hand while using his left to work the horizontal elevator out front. This position was awkward, uncomfortable, and potentially dangerous, but it reduced wind resistance. Within a few inches of his right ear, the four-cylinder, homemade engine sputtered and crackled. The 16-horsepower engine turned two eight-foot, counter-rotating, pusher-type propellers set 10 feet apart. Sweat poured down Orville's face. Every thread of clothing was soaked. He glanced to the left wing where 37-year-old Wilbur Wright gripped a strut to help steady the biplane. Its 21-foot length was supported by wooden skids on a yoke that ran freely on two small, tandem wheels along a wooden monorail.

Conditions at 2 p.m. were far from ideal, but there had been enough delays. Orville nodded to Wilbur, who dropped his hand from the strut. The fragile biplane gathered speed as it wavered along the monorail.

## Chapter One

Huffman Prairie, 1904 (Wright State University Archives, Wright Brothers Collection)







In the air over Huffman Prairie. The pilot lay prone on the lower wing.

Orville's head and shoulders leaned forward over the edge of the wing like the bowsprit on a sleek sailing vessel. At the end of the monorail the airplane's speed was about 25 mph. The craft leaped upward to a height of eight feet and covered a distance of 25 feet before dropping to the ground.

It skidded over the sodden pasture, spraying its pilot with black mud and brown muck. It landed with sufficient force to crack several of the six-foot, white-pine

spars that separated the upper and lower wings, and nearly catapulted Orville from his precarious perch.

Notwithstanding aching muscles and a sore neck, Orville smiled broadly and his blue eyes sparkled as he climbed from the wing. Wilbur grinned with delight and relief. They had flown again! They had established far better marks during their historic first flights at Kitty Hawk, North Carolina, but again they had prevailed. And a Huffman Prairie tradition was established.



Wilbur Wright, born April 16, 1867, died May 30, 1912 (*Wright State University Archives, Wright Brothers Collection*)



Orville Wright, born August 19, 1871, died January 30, 1948 (*Wright State University Archives, Wright Brothers Collection*)

# CHARLES E. TAYLOR



(Federal Aviation Administration Aviation News)

Charles “Charlie” E. Taylor was born on May 24, 1868, near Cerro Gordo, Illinois. After his family moved to Lincoln, Nebraska, he attended school and then worked at several kinds of mechanical jobs. In 1894 he married Henrietta Webbert, a woman from Dayton, Ohio, and two years later he decided to relocate to her hometown in search of better job opportunities. Henrietta’s uncle owned the building that housed the Wright Cycle Company in Dayton, and through him Taylor became acquainted with the Wright brothers. By the time Taylor met the Wright brothers, he had his own machine shop, and the Wrights asked for his help in making wheel hubs and coaster brakes for their bicycles. Taylor eventually went to work full-time for Wilbur and Orville because they offered him good money (30 cents an hour) and because he liked them. Katharine Wright did not care for Taylor’s excessive cigar smoking (up to 20 cigars a day!), but Wilbur and Orville knew they could always count on him. They trusted Taylor to watch their bicycle shop while they were busy working on their airplane, and later they turned to him for help with their plane. Taylor helped the Wrights build a wind tunnel that could measure the lift and drag of a wide variety of wing designs. When Wilbur and Orville were finally satisfied with the design of their airplane, they discovered that they could not buy a

suitable engine for it, so they told Taylor what they needed and he built it from scratch. He delivered a 12-horsepower engine that would successfully carry, for the first time in history, a man and a glider through the air. The Wright brothers’ airplane flew at Kitty Hawk, North Carolina, through the power of Charlie Taylor’s engine.

After the Wright brothers’ first successful flight, Taylor was put in charge of the maintenance of the airplanes kept and tested at Huffman Prairie. Later, when the Wrights began manufacturing airplanes, Taylor was responsible for the manufacture of the engines. In 1911, Cal Rodgers came to town, took flying lessons from the Wrights, and signed Taylor on as his chief mechanic in his bid to become the first person to ever fly coast to coast. After the long, arduous, but ultimately successful flight of Rodgers and his Vin Fiz (a plane that had to be constantly rebuilt by Taylor and his assistants because it crashed 16 times as it made its way across the country), Taylor returned to Dayton, but in 1928 he

decided to move to California. He was working as a machinist there when he was contacted by Henry Ford about going to Greenfield Village in Dearborn, Michigan, to help in the reconstruction of the Wright home and the Wright Cycle shop (both of which Ford had saved from almost certain demolition in Dayton). Taylor worked on the reconstruction for several years and even built a replica of his engine. After World War II broke out, he took a job in a factory making cartridge shells. During the last years of his life, Taylor suffered from poor health, but he also started receiving recognition for the vital role he had played in the Wright brothers’ historic flight. When the public became aware of Taylor’s failing health, people from all over the country sent him letters and gifts to show their gratitude, and the Aircraft Industries Association volunteered to pay for his long-term care. On January 30, 1956, the last surviving direct contributor to the First Flight passed away. He was inducted posthumously into the National Aviation Hall of Fame in 1965.



Close-up of the four-cycle Wright engine, built by Charlie Taylor, used in 1910 (Wright State University Archives, Wright Brothers Collection)

Sources: “Charles Edward Taylor – 1965,” *National Aviation Hall of Fame Enshrines*, online at <http://www.nationalaviation.org/enshrinee/taylor.html>; Tom Crouch, *The Bishop’s Boys: A Life of Wilbur and Orville Wright* (New York, Norton, 1989); Howard R. DuFour, *Charles E. Taylor: The Wright Brothers Mechanician* (New Carlisle, Ohio, DuFour, 1997).



Flyer I, first flight on December 17, 1903, Kitty Hawk, North Carolina (NCR Archives, Montgomery County Historical Society)



## KITTY HAWK, NORTH CAROLINA

Trial	Pilot	Time	Distance
1	Orville	12 seconds	120 feet
2	Wilbur	12 seconds	175 feet
3	Orville	15 seconds	200 feet
4	Wilbur	59 seconds	852 feet

Statistics of the brothers' flights at Kitty Hawk, North Carolina, on December 17, 1903, show that first Orville, then Wilbur, had made the world's first free, controlled, and sustained flights in a power-driven, heavier-than-air machine. Orville's initial flight of 120 feet matched the length of the 1982 Space Shuttle *Columbia*.

Source: Arthur G. Renstrom, *Wilbur & Orville Wright: A Chronology Commemorating the Hundredth Anniversary of the Birth of Orville Wright, August 19, 1871* (Washington, 1975), p 13.

## HUFFMAN PRAIRIE: A LOGICAL CHOICE

According to Fred Kelly, the Wright brothers' close friend and biographer, the pioneers' initial incentive had been "to gain the distinction of being the first of mankind to fly." They had not envisioned any practical use for their invention. But after their success at Kitty Hawk, they began to think the airplane "could be developed into a machine useful for scouting in warfare; for carrying mail to isolated places; for exploration; and that it would appeal to those who could afford it for sport."<sup>1</sup>

Their airplane, however, required considerable refinement before production models could be manufactured and sold. They also needed a great deal more experience in actual flying before they could demonstrate the machine or train pilots. "Much practice would be required . . . and that would mean more expense in proportion to income for they would have less time for building and repairing bicycles," their primary source of income.<sup>2</sup>

Thus, financial circumstances dictated

the need to locate a site for flying and experimental work close to Dayton. The brothers selected an 84-acre farm along the eastern shore of the Mad River (a tributary of the Great Miami River) in Greene County, about eight miles east of Dayton and two miles from the Village of Fairfield.<sup>3</sup> Since Mr. Torrence Huffman, a prominent Dayton banker, owned the property, it was known as "Huffman Prairie." The land was mostly flat land in the river bottom or flood plain. Adjacent to the pasture's northern border were the Dayton-Springfield Pike and the track of the Dayton-Springfield-Urbana electric interurban rail system (known locally as the "Damned Slow and Uncertain"). Trolleys stopped every 30 minutes at the small depot, known as Simms Station, adjacent to Huffman Prairie. Surrounding the depot lay open farm country composed of large fields, most of them grassy and bordered by fences and clusters of tall, spreading trees. Here and there, widely separated, a house or a barn lifted a gray roof amid the lush greenery.

The site held several advantages for the struggling pioneers. Mr. Huffman allowed

them to use the land rent-free with the sole restriction that the Wrights keep the farm gates closed to prevent the horses and cattle from wandering away. The trolley and the short ride from their bicycle shop solved their logistical concerns. And the field's relative isolation gave the Wrights the privacy they desired while they perfected their invention and waited for the United States government to grant them a patent.

During April and May 1904, the Wright brothers, nattily attired in business suits, commuted daily (but never on Sundays) between their workshop in Dayton and Simms Station, bringing lumber, airplane materials, and parts. They cleared the tall prairie grass with scythes. Then they erected a shed-like hangar in the southeast portion of the field, far from Simms Station, to give them privacy from prying eyes and curious spectators. When they finished, they had, as one writer noted, "erected the first airport in the world."<sup>4</sup>

Although the site offered comparatively flat terrain and convenient, economical transportation, it was hardly an ideal test facility. Poles and power lines ran along the northern border; a high bluff lay to the



west; and 50-foot-high trees dotted the landscape. In a June 21, 1904 letter to the brothers' mentor, Octave Chanute, Wilbur wrote:<sup>5</sup>

We are in a large meadow of about 100 acres. It is skirted on the west and north by trees. This not only shuts off the wind somewhat but also gives a slight downtrend. However, this matter we do not consider anything serious. The greater troubles are the facts that in addition to cattle there have been a dozen or more horses in the pasture and as it is surrounded by barbwire fencing we have been at much trouble to get them safely away before making trials. Also the ground is an old swamp and is filled with grassy hummocks some six inches high so that it resembles a prairie dog town. This makes the track-laying slow work. While we are getting ready the favorable opportunities slip away, and we are usually up against a rainstorm, a dead calm, or a wind blowing at right angles to the track.

Progress was measured in seconds and in feet. On August 4, for example, Wilbur

was airborne for 20 seconds (including the run down the monorail), and traveled 272 feet.

In September, the fledgling aviators installed a catapult launching device to counter the erratic winds and increase lift at takeoff. The pyramidal tower, or "derrick" to use Wilbur's term, consisted of four 30-foot poles erected teepee-fashion at one end of the monorail. Inside the tower a heavy weight was lifted to the top and linked to the airplane by a series of pulleys and ropes. After considerable experimentation, a single weight of 1,600 pounds was found to be the most effective. Falling some 16 feet, the weight exerted a forward pull equal to 350 pounds, enough to get the aircraft into the air with "a run of only 50 feet even in a dead calm."<sup>7</sup> When the catapult was used for the first time, Wilbur flew over 2,000 feet.<sup>8</sup>

Thus, well and truly into the air, the brothers set about learning to fly and mastering flight dynamics, being always cautious to remain within the confines of Mr. Huffman's prairie in the belief that property rights extended vertically. They flew over the cows and collided with birds. On September 20, Wilbur made history's first controlled circle during a flight lasting

1 minute 3.8 seconds. On November 9, he completed four circles, covering a distance of nearly three miles in 5 minutes 4 seconds. Orville duplicated the record on December 1. By December 9, 1904, their flight log stood at 105 launches for a total flight time of 50 minutes, and a top landing speed approaching 50 mph.<sup>9</sup>

When the flying season ended in December, the Wrights disassembled the airplane, packed it and all their tools and gear into crates and boxes, and moved them into winter quarters in their West Dayton bicycle shop. The vacated hangar became a shelter for livestock. During the winter of 1904-1905, the aviation pioneers began working on the Wright Flyer III, the aircraft that would become the world's first practical airplane.

In spring 1905, the brothers built a slightly larger hangar closer to the Simms Station depot. Orville opened the flying season on June 23 with a flight of 272 feet in 9.5 seconds. While landing, the left wing struck the ground and cracked four corner ribs. This was hardly an auspicious start for a new campaign. Nonetheless, with the 1905 Flyer III, the Wrights finally solved the mystery of powered flight and developed the first truly practical airplane.<sup>10</sup>



The Wright brothers' primary source of income was a bicycle manufacturing and repair business located at 1127 W. Third Street in Dayton. This seasonal business allowed them ample time in autumn and winter for flight experimentation with gliders and the first Wright Flyers. (Wright State University Archives, Wright Brothers Collection)



Milton Wright, a bishop in the Church of the United Brethren in Christ and a loyal supporter of his sons' activities, chronicled their successes in his personal diary. The first flight over Huffman Prairie was entered laconically, "Went at 9:00 [trolley] car to Huffman's farm. At 2:00 Orville flew about 25 feet. I came home on 3:30 [trolley] car. It rained soon after." (Photo and diary from Wright State University Archives, Wright Brothers Collection)



# EARLY WRIGHT AIRPLANES

All of the Wrights' early powered airplanes were named Flyers:

*Flyer I* (1903) was called the *Kitty Hawk*. After Wilbur's final flight the afternoon of December 17, 1903, a gust of wind upended the fragile aircraft. The wreckage was disassembled and the parts shipped to Dayton. In 1916, the components were reassembled, replacement parts were inserted, and the restored *Kitty Hawk* was exhibited at the Massachusetts Institute of Technology. On January 31, 1928, Orville shipped the machine to the Science Museum in London on indefinite loan for exhibition. On December 17, 1948, the 1903 airplane was installed formally in the Smithsonian Institution, Washington, D.C.

*Flyer II* (1904) was the first airplane over Huffman Prairie. In it, the brothers executed the first controlled circles. After the 1904 flying season ended, the engines, propellers, and other parts were used in the construction of the more powerful 1905 *Flyer III*.

*Flyer III* (1905) taught the Wrights "the secrets of powered flight," according to historian Charles Gibbs-Smith. Disassembled after the 1905 season, it was restored in June 1950 and placed on permanent exhibit at the Carillon Historical Park in Dayton, Ohio.

*Military Flyer* (1909), also known as Signal Corps Airplane No. 1, was the first heavier-than-air vehicle purchased by the Army. On August 2, 1909, the Aeronautical Board formally accepted the airplane at a cost of \$25,000 plus a \$5,000 bonus for exceeding the specified minimum speed of 40 mph by 2 mph in speed trials. For the next two years, this airplane was the only one in the Army inventory. In 1911, Signal Corps Airplane No. 1 was sent to the Smithsonian Institution for exhibition.



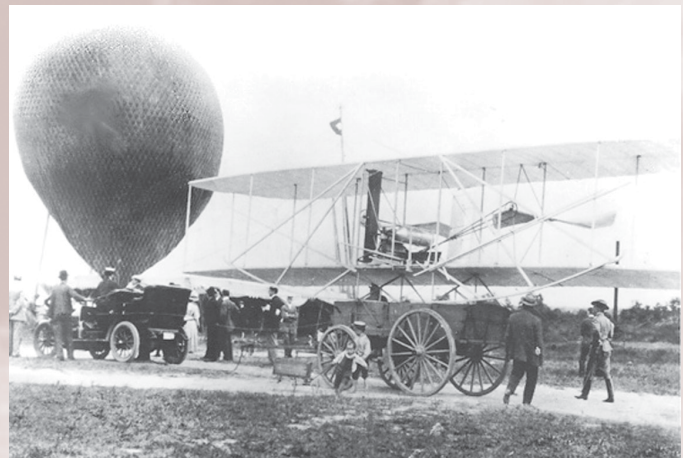
The Flyer III over Huffman Prairie in 1905



The 1903 Flyer I ready for its first flight, November 24, 1903 (Wright State University Archives, Wright Brothers Collection)



Orville and Wilbur discuss the Flyer II at Huffman Prairie in May 1904. (Wright State University Archives, Wright Brothers Collection)



The Military Flyer meets Army specifications for wagon transport, Fort Myer, August 1908. (Wright State University Archives, Wright Brothers Collection)



The pioneers learned to bank, turn, and make circles and figure eights with ease. Their longest flight of the year came on October 5, when Wilbur was airborne for 39 minutes 23 seconds. He flew over 24 miles at an average speed of 38 mph while making 29 circuits of the pasture.<sup>11</sup>

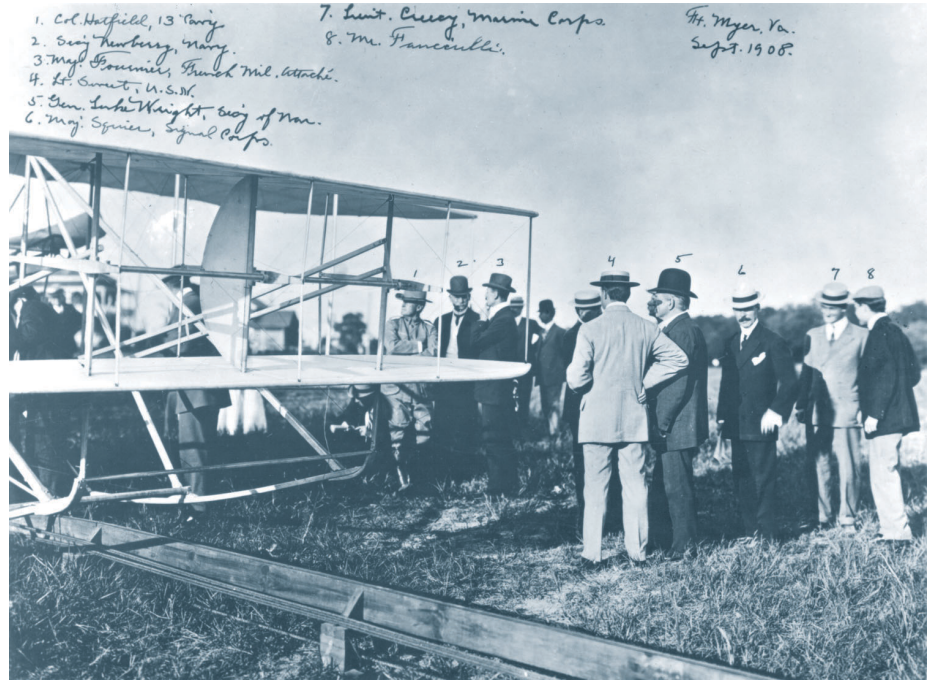
For the next three years, Dayton remained home base while the brothers traveled to Washington and Europe and captured the attention of both. During this time their genius produced both the vehicle and the spirit that launched the U.S. Army Signal Corps into heavier-than-air flight.

## THE SIGNAL CORPS MACHINE

On February 10, 1908, the newly established Aeronautical Division of the Signal Corps accepted the Wrights' bid to provide the Army with its first heavier-than-air flying machine. The proposed machine was to weigh 1,100 to 1,250 pounds and be capable of remaining in the air for at least one hour carrying two men, with a total weight of 350 pounds. It also had to achieve a speed of at least 40 mph. The



**Katharine Wright**, sister of Orville and Wilbur, was the brothers' staunchest supporter and constant companion, accompanying them on their travels in the United States and Europe. (Wright State University Archives, Wright Brothers Collection)



Dignitaries inspect the Wright Flyer prior to the beginning of the trials. As noted on the photo, they included: 1) Colonel Hatfield, 13th Cavalry; 2) Secretary Truman H. Newberry, U.S. Navy; 3) Major Fournier, French Military Attaché; 4) Lieutenant George Sweet, U.S. Navy; 5) General Luke Wright, [Office of the] Secretary of War; 6) Major George Squier, Signal Corps; 7) Lieutenant Richard B. Creedy, Marine Corps; 8) Mr. Funciulli. (Wright State University Archives, Wright Brothers Collection)



The Wright family home at 7 Hawthorn Street, Dayton, about 1900. The house, as well as the Wright Cycle Shop located at 1127 W. Third Street, was relocated to Henry Ford's Greenfield Village, Dearborn, Michigan. The dedication ceremony was held on Wilbur Wright's birthday, April 16, in 1938. Dayton inventor and General Motors executive, Charles F. Kettering, delivered the toast, and Wright-trained pilots, Frank Lahm and Walter "Brookie" Brookins, as well as Orville's good friend, English writer Griffith Brewer, addressed the crowd. (Wright State University Archives, Wright Brothers Collection)



# ORVILLE WRIGHT, FORT MYER, VIRGINIA, SEPTEMBER 1908

<u>Date</u>	<u>Record</u>	<u>Statistics</u>
September 9	Flight Endurance	1 hour 2 minutes, circling field 55 times at altitude of 80 feet
September 11	Flight Endurance	1 hour 10 minutes, circling field 57.5 times
September 12	Two-Man Flight*	9 minutes 6.33 seconds; Passenger: Major George O. Squier, president, Signal Corps Aeronautical Board
	Flight Endurance	1 hour 14 minutes, circling field 71 times at altitude of 300 feet

\*The first passenger in a powered airplane had been Charles W. Furnas, a Wright brothers' mechanic who flew with Orville on May 14 at Kitty Hawk, North Carolina. The first military passenger was Lieutenant Frank P. Lahm who flew during the acceptance trials at Fort Myer on September 3, 1908.



Lieutenant Thomas Etholen Selfridge was commissioned in the Artillery Corps in 1903. In May 1908, he flew an airplane he helped design with the assistance of Alexander Graham Bell and Glenn H. Curtiss, thus making him the first military person to pilot a heavier-than-air machine. With his tragic demise at Fort Myer in September 1908, Selfridge was also the first military person to lose his life in an airplane.

price was to be \$25,000, and delivery was scheduled for August 28, 1908.

The Wrights based their bid on the capabilities of their 1908 model aircraft. Designed as a military vehicle for both training and reconnaissance functions, the new airplane contained two major improvements over earlier models, one in the engine and one in the airframe. The engine had four vertical (rather than horizontal) cylinders, which raised its output to 35 horsepower, continuously.<sup>12</sup> The new airframe allowed for two people and, since “manifestly, for military purposes it was essential that both pilot and passenger should sit upright,” the frame was fitted with two side-by-side seats.<sup>13</sup> Thus, the new airplane was designed to fly faster and longer, and to carry two people, upright, either of whom could control the aircraft.<sup>14</sup>

Before the Army would accept it, the airplane had to pass endurance and speed tests at Fort Myer, Virginia, in September 1908. The brothers decided that Orville would fly the tests. On May 17, Wilbur departed for Europe, where he spent the next year demonstrating Wright airplanes, promoting sales, and training other pilots. Orville, after extensive spring practice at Kitty Hawk, North Carolina, and summer refitting in Dayton, shipped the airplane to Fort Myer in August.

According to one observer, “when the official flight trials at Fort Myer began, the public journeyed there by the thousands to see the mystery of flight dissolved and the skeptics at last proved wrong.”<sup>15</sup> Afternoon visitors from nearby Washington, D.C., included President William Howard Taft and many of the Cabinet members. The starting track and wooden tower for hoisting the catapult weight were erected on the Fort Myer drill ground, surrounded by buildings and tall trees. These limitations constrained straight flight,

without turns, to only “a few hundred yards at the most.”<sup>16</sup> Nevertheless, Orville treated spectators to new world’s records, day after day, in flight endurance.<sup>17</sup>

The tests were suspended on a tragic note on September 17, when Orville and a passenger, Lieutenant Thomas E. Selfridge, crashed from an altitude of 125 feet. The accident occurred “when one of the propellers split, causing it to lose pushing power, and a stay wire to the tail was then torn loose, making the tail uncontrollable.” Lieutenant Selfridge sustained a fatal skull fracture when he struck one of the wooden uprights of the framework.<sup>18</sup> Orville suffered a fractured left leg and four cracked ribs. He remained hospitalized at Fort Myer until late October, returning to Dayton on November 1.

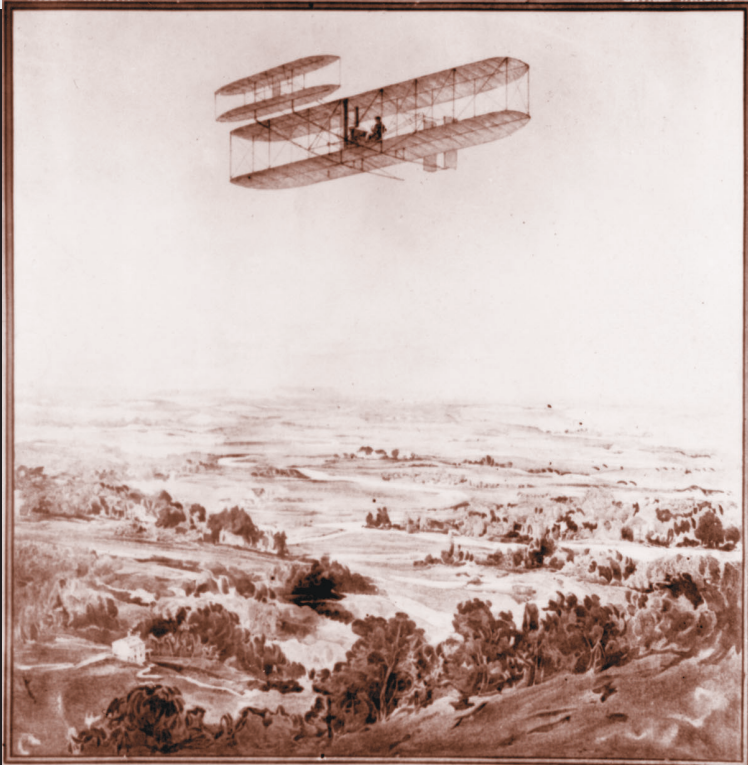
The Army, however, was impressed with the airplane’s overall performance prior to the crash and granted an extension of the contract delivery date until the summer of 1909.

The interim period was a productive one for the Wrights. Orville recuperated in Dayton and, in January, he and sister Katharine joined Wilbur in Europe. Wilbur had been seeking European contracts, flying in exhibitions, and training pilots in France and Italy. He flew before European heads of state, including King Edward VII of England, King Alfonso XIII of Spain, and King Victor Emmanuel III of Italy. Government and military leaders of every major power took personal note. The Wrights were celebrated and honored wherever they appeared. Their return to the United States was marked by presidential honors in Washington and the largest, most impressive homecoming Dayton could arrange.

The celebrations did not stop their progress, however. June 1909 was spent in Dayton, testing propellers to determine the cause of the accident at Fort Myer and to



# THE WRIGHT BROTHERS HOMECOMING CELEBRATION JUNE 17-18, 1909



Daytonians came out in force to greet the Wright brothers at Union Station upon their return from Europe in 1909. The city welcomed them with a grand, two-day homecoming celebration. The festivities included the formation of a giant U.S. flag by 2,500 Dayton school children.



One of the two local medals presented to the Wrights by the Honorable Edward E. Burkhardt, mayor of Dayton, at the June 18, 1909, celebration held in Dayton. The brothers also received state of Ohio medals and a special United States Congressional Medal: "In recognition of their ability, courage and success in navigating the air."

Source: Fred C. Fisk and Marlin W. Todd, *From Bicycle to Biplane* (West Milton, Ohio, 1990)

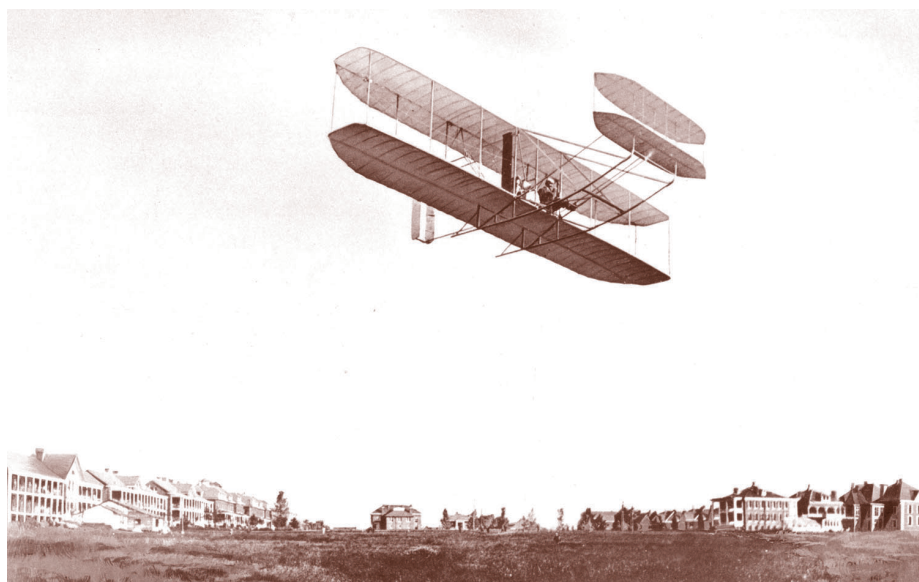




Preparing for flight at Fort Myer. The airplane is mounted on the launching rail and is being connected to the weight in the starting derrick in the background. (Wright State University Archives, Wright Brothers Collection)



Poised for takeoff, June 1909. Fort Myer soldiers pull the rope raising the drop-weight to the derrick peak. (Wright State University Archives, Wright Brothers Collection)



Airborne over Fort Myer with Orville Wright at the controls. The buildings surrounding the drill grounds constrained straight flight. (Wright State University Archives, Wright Brothers Collection)

preclude similar problems in the upcoming flight tests.

The Wright family returned in force to Fort Myer on June 20, 1909, to resume flight tests. Wilbur was present, along with sister Katharine, but Orville did all the flying. Presumably as a matter of pride, he wanted to finish what he had started the year before.

The Wrights brought with them an improved version of their "Signal Corps machine." Overall design changes included a "combination of a front movable rudder with a fixed horizontal plane in the rear of the machine in contrast to the front horizontal rudder" of the 1903-1908 models.<sup>19</sup> Orville flew a series of short test flights with the new model between June 29 and July 19, then prepared for the two crucial tests of endurance and speed. To demonstrate endurance, the aircraft had to remain aloft for one hour carrying two persons. On July 27, with Lieutenant Frank P. Lahm aboard, Orville flew for 1 hour 12 minutes 37.8 seconds, thereby exceeding the Army standard and setting a new world record. President William Howard Taft was among the 10,000 cheering spectators as the airplane circled the drill field almost 80 times at an altitude of 150 feet.<sup>20</sup>

The speed test was flown on July 30. Orville and Lieutenant Benjamin D. Foulois, his passenger, flew a cross-country speed course between Fort Myer and Shuter's (sometimes spelled Shooter's) Hill, near Alexandria, Virginia. This first-



Officers of The Wright Company included Orville, left, and Wilbur as chief executives. (Wright State University Archives, Wright Brothers Collection)



ever cross-country flight covered a round-trip distance of 10 miles.

Seven thousand witnesses, again including the president, cheered as the airplane lifted from the monorail at 6:46 a.m., then watched as it twice circled the drill field to gain altitude. Cheers dissolved into hushed murmurs as the aircraft disappeared from view in the direction of Alexandria. Even Wilbur and Katharine Wright were tight-lipped, although they had the utmost confidence in both man and machine. The airplane popped up momentarily, then disappeared again between two ridges.

When it reappeared heading straight for the drill field, the crowd waved hats, handkerchiefs, and anything else at hand. The roar of cheers and applause “was loud enough to be heard by the two air travelers despite the noise of the engine alongside them.”<sup>21</sup> The 10-mile flight was clocked at a speed of 37.735 mph outbound, and 47.431 mph on the return, for an average speed of 42.583 mph. They had flown more than 2 mph faster than their goal of 40 mph, and had done so at an altitude of 450 to 500 feet, an exceptional height.<sup>22</sup>

On August 2, the Aeronautical Board formally accepted the Wright machine. Brigadier General James Allen, chief signal officer of the Army, appointed the members of the “Board of Officers Convened by Office Memorandum No. 18, Office of the Chief Signal Officer of the Army, dated June 21, 1909, for the Purpose of Observing Trials of Aeronautical Devices, Etc.” Major George O. Squier, Signal Corps, was the Board’s president. Lieutenant Frederic E. Humphreys, Corps of Engineers, served as the recorder. The members of the Board were Lieutenant George C. Sweet, U.S. Navy; Major Charles Saltzman, Signal Corps; Lieutenant Frank P. Lahm, Signal Corps; and Captain C. deForest Chandler, Signal Corps. Upon payment of \$25,000 for the airplane and a bonus of \$5,000 for exceeding by 2 mph the specified minimum speed of 40 mph, Signal Corps Airplane No. 1 entered the Army inventory.

To complete the terms of their contract, the Wrights were required to instruct two men in the handling and operation of their flying machine. (No extra payment was allowed for this purpose.)<sup>23</sup> Since the Fort Myer commander insisted that his drill field be returned to its primary purpose, the Army leased suitable acreage from the Maryland Agricultural College at nearby College Park, Maryland. Wilbur gave flight instruction to three Signal Corps officers:



## MAJOR GENERAL BENJAMIN D. FOULOIS

Lieutenant Benjamin D. Foulois was the Army Signal Corps’ official observer in the passenger seat of the Wright Flyer when Orville Wright passed the all-important speed trial on July 30, 1909, at Fort Myer, Virginia. Based on the successful completion of the speed test and a previous endurance test, the Army ordered its first airplane, Signal Corps Airplane No. 1. Foulois later described his role in that historic flight: “I would like to think that I was chosen on the basis of my intellectual and technical ability, but I found out later that it was my short stature, light weight, and map-reading experience that tipped the decision in my favor.”

After returning from an aeronautical congress in France in late 1909, Lieutenant Foulois started to take flying lessons with Wilbur Wright, but after other trainees damaged Signal Corps Airplane No. 1, it and Foulois were reassigned to Fort Sam Houston in Texas where Foulois was ordered to teach himself to fly. There he became the Army’s only active pilot, navigator, instructor and observer before he had even soloed in an airplane. He completed flight training on his own, writing to Orville Wright for advice. Foulois later joked that he was the world’s first correspondence-school pilot.

Benjamin Foulois served as chief of the Materiel Division at Wright Field from June 1929 to July 1930 and resided in the commander’s official residence, a nineteenth-century farm house located near Huffman Prairie, the field where the Wright brothers experimented with their flying machine and where they later established a flying school. During his career Foulois held numerous leadership positions. He won the prestigious Mackay Trophy for his command of the 1931 Air Corps’ maneuvers that were based out of Wright Field and went on to command the U.S. Army Air Corps during the years leading up to World War II. Foulois was one of the few brave men who chose to endure personal and professional retaliation for his outspoken support for an air force independent of Army control. In later years he received belated recognition for his numerous contributions to military aviation and was honored at Wright-Patterson Air Force Base in 1989 when Building 88, his former home and now the official residence of the Aeronautical Systems Center commander, was memorialized in his honor.

Source: John F. Shiner, “Benjamin D. Foulois: In the Beginning,” *Makers of the United States Air Force*, John L. Frisbee, ed. (Washington, D.C., United States Air Force, 1987).





The 1910 Wright hangar at Simms Station housed both the Wright Exhibition Company and the Wright School of Aviation. General Henry H. Arnold wrote, in 1949: "The Simms Station is gone today ... It would have been a fine exhibit in the midst of what is now sprawling Patterson Field, with Wright Field just over the hill—virtually in the center of the modern United States Air Force's technical proving ground." (*United States Air Force Museum*)



Both buildings of The Wright Company factory in West Dayton were completed in 1911. (*Wright State University Archives, Wright Brothers Collection*)



The Wright brothers experiment with pontoon hydroplanes on the Miami River, Dayton, Ohio, March 21, 1907. (*Air Force Historical Research Agency*)

Lieutenants Lahm and Foulois, both of whom had flown with Orville during the acceptance flights, and Lieutenant Frederic E. Humphreys (on special duty from the Corps of Engineers). When flight instruction ended on November 5, Wilbur was ready to join Orville in a bold, new venture.

## THOSE DARING YOUNG MEN ...

Aviation became an industry in Dayton with the incorporation of The Wright Company on November 22, 1909, with Wilbur Wright as president and Orville as one of two vice presidents. The company listed a capital stock of \$1 million, a New York corporate office, and a planned manufacturing facility in Dayton. It was time. Since Wilbur's European tour in 1908, airplanes designed and licensed by the Wrights had been sold abroad by French, British, and German companies.

By November 1910, construction was complete on the first of two factory buildings in West Dayton, and the company was turning out two airplanes a month. The company also leased Mr. Huffman's land, where a large, new hangar near Simms Station advertised to all that the Wrights had returned to fly over Huffman Prairie. The 1910 hangar housed two branches of the Wright corporation: the Wright Exhibition Company and the Wright School of Aviation. The exhibition company, managed by Roy Knabenshue, flew airplanes at county fairs, aero shows and exhibits, speed races, and other large public gatherings to display Wright aircraft and attract potential customers. Pilots received a salary of \$20 per week, plus \$50 for every day they flew. The Wright Company received any prize money earned and charged \$1,000 per day each time one of the team members performed. The exhibition company, however, was short-lived. The Wrights dissolved the company and abandoned the exhibition business in 1911 due to the heavy loss of life associated with exhibition flying. Of the original nine team members, five died in airplane crashes.<sup>24</sup>

The second branch made Simms Station famous as the site of the Wright School of Aviation, which operated from 1910 through 1916. Other Wright schools for training "operators" were instituted at Montgomery, Alabama, now the location of Maxwell Air Force Base, in 1910; at Augusta, Georgia, in 1911; and at Belmont



Henry H. Arnold  
A. Roy Brown  
Cal P. Rodgers  
Arch Hoxsey  
P. O. Parmelee  
O. A. Brindley  
Harry N. Atwood  
L. E. Norman  
C. LaQ. Day  
O. A. Danielson  
Rose Dougan  
Verne Carter  
Maurice Coombs  
Percy E. Beasley  
W. E. Orchard  
Louie Mitchell  
Andrew Drew  
C. Couturier  
Farnum T. Fish  
William Kabitzke  
Howard M. Rinehart  
W. E. Bowersox  
W. J. Sussan  
James L. Gordon  
P. S. Kennedy  
G. A. Magor  
George Breadner  
A. C. Harland  
Harry Swan  
W. E. Robinson  
Kenneth Whiting  
Frank T. Coffyn  
C. J. Peterson  
Robert E. Lee  
K. G. MacDonald  
Albert Elton  
Charles Wald  
M. B. Galbraith  
Robert McC. Weir  
S. T. Edwards

Frank Lahm  
Charles deF. Chandler  
Robert G. Fowler  
Duval LaChappelle  
J. C. Turpin  
J. C. Henning  
H. V. Hills  
C. E. Utter  
Marjorie Stinson  
Lyle H. Scott  
J. M. Alexander  
E. P. Beckwith  
George H. Simpson  
A. G. Woodward  
J. A. Harman  
O. G. Simmons  
A. A. Merrill  
Wilfred Stevens  
F. J. Southard  
Maurice Priest  
Al A. Bressman  
L. E. Brown  
C. J. Creery  
Edward A. Stinson  
Lloyd S. Breadner  
N. A. Magor  
C. E. Neidig  
Harley Smith  
L. B. Ault  
M. S. Beal  
Griffith Brewer  
L. W. Bonney  
C. A. Terrell  
Goroku Moro  
Paul Gadbois  
George A. Gray  
Bernard L. Whelan  
Basil D. Hobbs  
G. S. Harrower  
C. McNicoll

John Rodgers  
Thomas DeW. Milling  
Walter Brookins  
A. L. Welsh  
Howard Gill  
Harold H. Brown  
A. B. Gaines Jr.  
Mrs. Richberg Hornsby  
C. Ando  
Ferdinand Eggena  
J. A. McRae  
T. D. Pemberton  
Gordon R. Ross  
A. Y. Wilks  
T. C. Wilkinson  
C. L. Webster  
Philip W. Page  
Arch Freeman  
Grover C. Bergdoll  
John A. Bixier  
M. T. Schermerhorn  
K. F. Saunders  
John Galpin  
M. C. Dubuc  
W. H. Chisam  
J. R. Bibby  
A. W. Briggs  
J. C. Watson  
J. C. Simpson  
C. G. Bronson  
Ralph Johnstone  
R. J. Armor  
Frank Kitamura  
B. B. Lewis  
L. G. Ireland  
J. G. Klockler  
R. M. Wright  
J. A. Shaw  
H. B. Evans

## PIONEER FLYERS TRAINED ON HUFFMAN PRAIRIE FLYING FIELD



Marjorie Stinson was one of three women who learned to fly at Huffman Prairie. She was also the only woman granted a pilot's license by the Army and Navy Committee of Aeronautics. (War Department Records, National Archives and Records Administration)

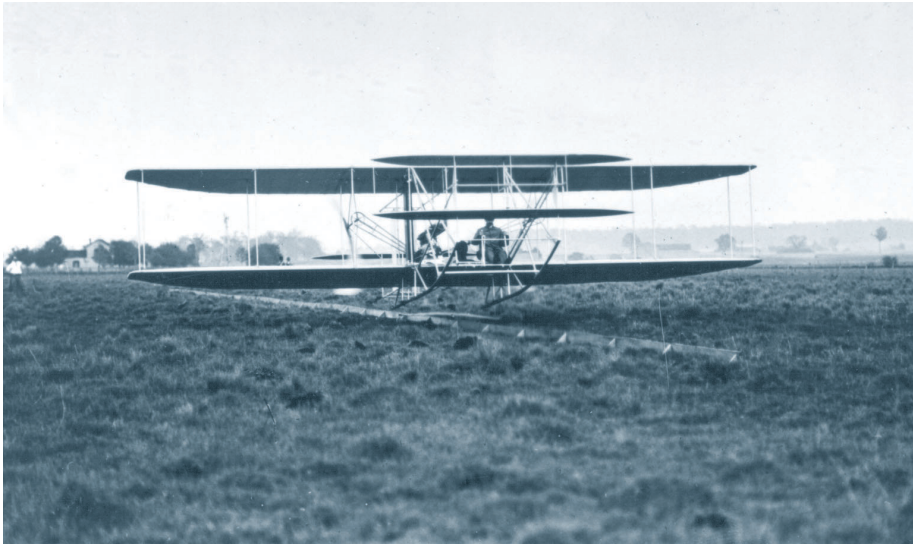


Some of the Canadians who earned their wings at the Wright School of Aviation are pictured at Simms Station in 1915. (Wright State University Archives, Wright Brothers Collection)

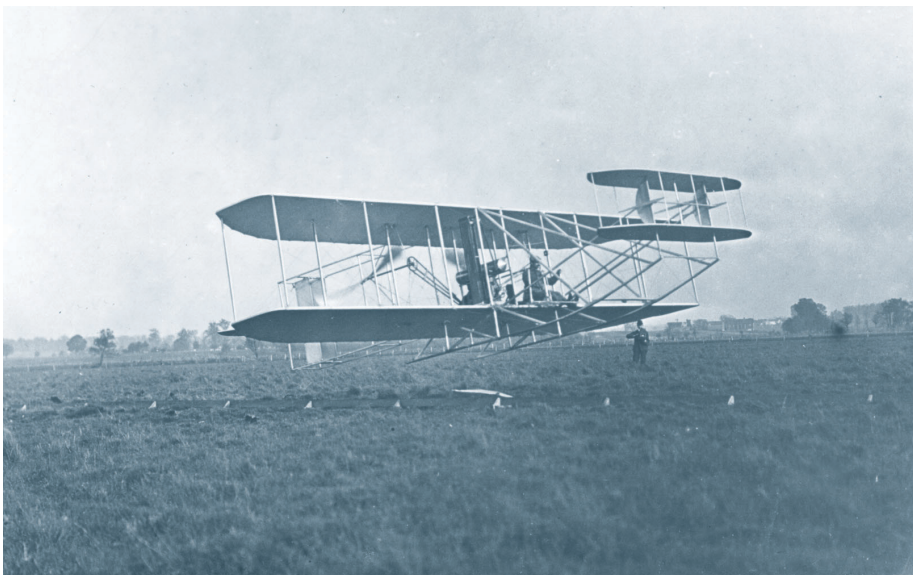


Lieutenant Henry H. Arnold at the Wright School of Aviation, 1911

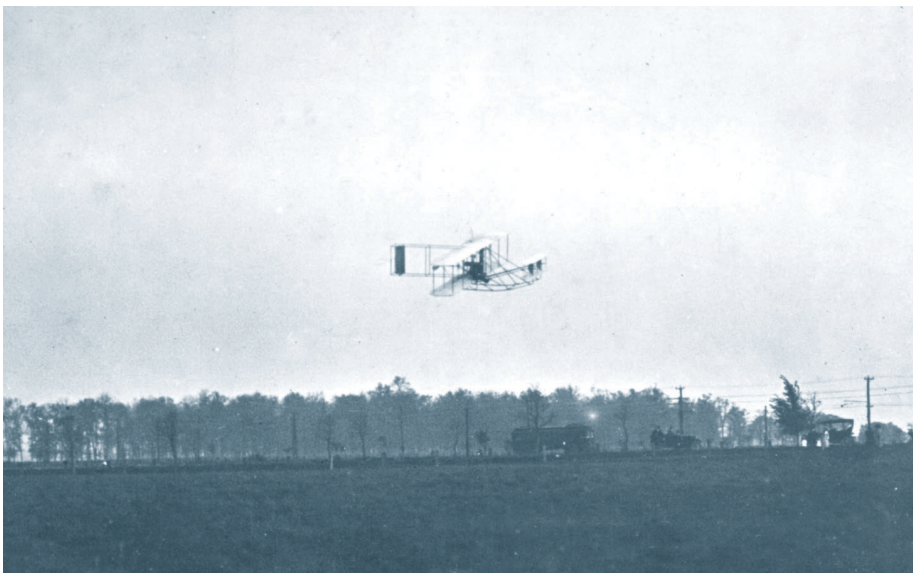




A Model A skims down the monorail . . . (Wright State University Archives, Wright Brothers Collection)



and takes off . . . (Wright State University Archives, Wright Brothers Collection)



into flight over Simms Station, 1910. Model As, built between 1907 and 1909, were the first Wright machines with two seats and the first in which the crew sat upright. Orville flew a Model A during the first military trials at Fort Myer, September 1908. (Wright State University Archives, Wright Brothers Collection)

Park, New York, in 1911. The Simms Station School advertised “four hours of actual practice in the air and such instruction in the principles of flying machines as is necessary to prepare the pupil to become a competent and expert operator.” Instruction in these necessary principles occupied students for most of their 10 days of training, with 5 to 15 minutes of each day spent in the air.

Tuition was \$250 per pupil, payable at the time of enrollment, and covered any incidental “breakage to the machine.” However, the airplanes used in training were equipped with duplicate controls so that the instructor could immediately assume control “should the student make any serious mistake.”<sup>25</sup>

Diverse groups of students came to Simms Station: civilians learning to fly their own purchases, Army officers heading for instructorships at Signal Corps Aviation Schools like the one at College Park, and even officers from the Navy. (The brothers offered to train a U.S. Navy pilot if the service would order a hydroplane from The Wright Company. The Navy agreed; the airplane was delivered July 15, 1911.) The May 1911 class, for example, included three civilian students and three military officers, Lieutenant John Rodgers, U.S. Navy, and Lieutenants Henry H. Arnold and Thomas DeWitt Milling, both of the Army Signal Corps. In all, 119 pilots trained at Huffman Prairie. Many of them were Canadians en route to the Great War, including A. Roy Brown who would receive the aerial credit for downing Germany’s “Red Baron” (Captain Manfred von Richthofen).

Students at the Wright School of Aviation learned about the airplane from the inside out: how to maintain, repair, and modify the machine, as well as how to fly it. Exchanging aspiration for perspiration, Arnold, Milling, Rodgers, and their classmates took off their coats and neckties, rolled up their sleeves, and got to work, skinning their knuckles and smearing oil, grease, and dirt on their shirts, trousers, and shoes. After this indoctrination on the field and in the West Dayton factory, students knew the function of every part of an airplane and understood the principles followed in putting wood, fabric, and a source of power together in a combination that permitted man to leave the ground and control his journey through the air.

Such familiarization was especially valuable to the military students. In his autobiography, *Global Mission*, Arnold commented:



Milling and I were soon grateful for the days spent in the factory, for in addition to learning how to fly we found we would have to master the construction and maintenance features of the Wright machine well enough to teach our own mechanics the ABC of a ground crew's job when we went to our first station. There were no crew chiefs nor aircraft mechanics in the Army in those days.<sup>26</sup>

The schedule for Arnold's training typified the Aviation School pattern. On May 9, 1911, Lieutenant Arnold made his first flight. Chief instructor Art L. Welsh, who had earned his own wings just a year earlier, gave the seven-minute lesson. By his nineteenth flight, Arnold could land the airplane without assistance. After 28 flights and a cumulative flying time of 3 hours 48 minutes, Arnold was graduated and certified as a qualified military aviator.

The Wrights taught their students more than the mechanics of flight; they imbued them with a "can-do" spirit. As Arnold wrote in his autobiography, "More than anyone I have ever known or read about, the Wright brothers gave me the sense that

nothing is impossible. I like to think—and during World War II—often did, that the Air Force has rooted its traditions in that spirit."<sup>27</sup>

The brothers maintained an active relationship with the Army Signal Corps aviation program, serving as consultants and teaching both pilots and instructors. These included Lieutenant Lahm and Captain Charles deForest Chandler, commandant of the Signal Corps Aviation School at College Park.<sup>28</sup>

The Wright Company used Huffman Prairie for other purposes as well. It served as a flight testing range for their aircraft and a staging area for several significant flights. The most noteworthy of these occurred in November 1910 when Phil Parmalee, one of their exhibition team pilots, took off in a Wright aircraft en route to Columbus, Ohio. On board was a cargo of silk for delivery to the Morehouse-Martens Company, which had paid almost \$5,000 for the shipment. The one-hour flight was the first time an airplane carried commercial freight.<sup>29</sup>

Although they did not know it, the brothers' career as a team was drawing to a close. On May 2, 1912, Wilbur fell

gravely ill with typhoid fever during a trip to Boston, Massachusetts. He returned to Dayton two days later and his condition worsened. He died May 30, 1912, at the age of 45. The entire nation mourned. President William Howard Taft, in his message to the Wright family, eulogized Wilbur as "deserving...to stand with Fulton, Stephenson, and Bell" in America's Hall of Fame for inventors.

Orville succeeded his brother as president of The Wright Company. He also carried on the tradition of invention with his development of the automatic stabilizer. Using a "special experimental machine Model E with very thick surfaces," Orville demonstrated his automatic stabilizer to three official representatives of the Aero Club of America. Seven circles of Huffman Prairie with "hands off controls" earned him the prestigious Aero Club of America Trophy of 1913 for this contribution to aviation.<sup>30</sup> Orville continued his personal flying career for only six years after his brother's death. On May 13, 1918, he flew the 1911 model Flyer one last time, alongside the first DeHavilland DH-4 manufactured by the Dayton Wright Company at Moraine City, south of Dayton.



Orville Wright piloting the Wright Model E. The Model E carried the automatic stabilizer that earned Orville the Aero Club of America Trophy for 1913. It also was one of only two Wright models with a single propeller. (*Wright State University Archives, Wright Brothers Collection*)



## END OF AN ERA

Huffman Prairie fell silent in February 1916. It was the end of an era. Although aviation pioneers no longer flew there, their names were not forgotten. Between May 1910 and February 1916, 119 pilots earned their wings at Simms Station. Most were civilians; one even came from Japan. Several were from the U.S. Army and U.S. Navy. There were also three daring young women who defied both gravity and convention. More than a third of the graduates were Canadians. Eager for World War I duty, they bypassed over-subscribed Canadian flying schools to earn the

wings required for acceptance into the Royal Flying Corps or the Royal Naval Air Service. All of their names are embossed on one of the special plaques that surround the Wright Memorial located in a 27-acre wooded park known as Wright Brothers Hill in Area B of Wright-Patterson Air Force Base. It sits atop a 100-foot bluff overlooking Huffman Prairie and Simms Station. Dedicated August 19, 1940, the memorial was conveyed to the U.S. Air Force on September 9, 1978, in honor of the 75th anniversary of the Wright's first powered flight. The part of Huffman Prairie where the original 1904 hangar stood was entered on the National Register of Historic Places on May 6, 1971, as the "world's first flying and landing field for airplanes."

## DAYTON'S FLOOD OF 1913

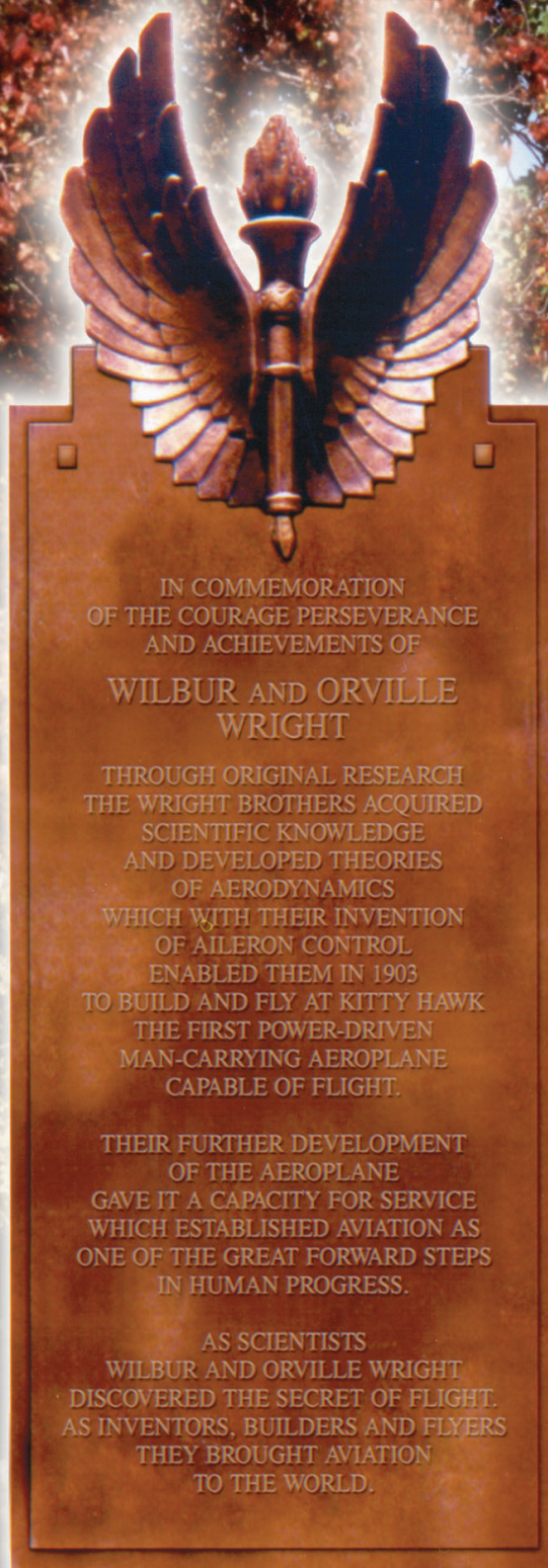


Huffman Dam, shown here on March 25, 1922, was one of five earthen dams built to prevent another disastrous flood in downtown Dayton.

In March 1913, melting snow and a three-day-long rainstorm deluged the Miami Valley and swelled Loramie Creek and the Great Miami, Mad, and Stillwater rivers, all of which converged and ran through the heart of Dayton. Portions of downtown Dayton were flooded to a depth of 10 feet. The disaster killed nearly 400 people in the Miami Valley and caused \$100 million in damages. The Miami Conservancy District, formed and led by John H. Patterson, president of National Cash Register (NCR), immediately outlined a plan to build retarding dams to control the amount of water flowing through urban areas. The Conservancy District purchased land along the rivers and proceeded to construct five earthen dams. One of the dams was along the Mad River near Huffman Prairie, where the Wright brothers had made many of their famous flights. Construction of Huffman Dam was completed in 1922, leaving Huffman Prairie in the flood plain.

The Signal Corps recognized the value of Huffman Prairie for a pilot training school and negotiated with the Miami Conservancy District to purchase the tract. This tract included Simms Station and the land on which The Wright Company established its School of Aviation between 1910 and 1916. At that time, the district did not own the land, but they immediately purchased the property from landowners and then leased it to the Signal Corps. On June 6, 1917, the Army established Wilbur Wright Field, one of four United States aviation schools for training pilots during World War I.





Inscription on the Wright Memorial obelisk



Orville Wright and Major General Henry H. "Hap" Arnold chat at the dedication of the Wright Memorial, August 19, 1940. (*Wright State University Archives, Wright Brothers Collection*)

Dayton dedicated its memorial to the Wright brothers on Orville Wright's sixty-ninth birthday, August 19, 1940. The 30-foot monument, made of pink North Carolina marble, overlooks the vast expanse of land that is Wright-Patterson Air Force Base and includes Torrence Huffman's Huffman Prairie.

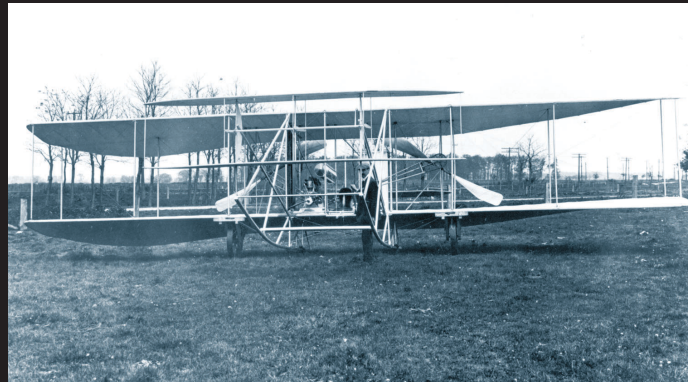


# BACK TO THE FUTURE

One of the National Aeronautics and Space Administration's (NASA) latest ideas for improving aircraft performance is actually based on an old idea borrowed from the inventors of flight, Wilbur and Orville Wright. In a joint program with engineers from the Air Vehicles Directorate of the Air Force Research Laboratory (AFRL) at Wright-Patterson Air Force Base, NASA researchers based their Active Aeroelastic Wing project on the Wright brothers' system of "wing warping." In order to make a Wright Flyer turn, the Wrights "warped" or twisted the wings, as birds do in flight. Later it was discovered that aerodynamic forces naturally wreak havoc on an airplane's wings and, in an effort to reduce the lack of flight control, airplane wings were shortened and made less flexible—and less efficient.

NASA and AFRL scientists hope to "harness" aerodynamic forces and use them to maneuver planes with less drag and increased fuel efficiency. An F/A-18 was modified by Boeing Phantom Works to be the research vehicle for the Active Aeroelastic Wing project. The wings of the F/A-18 were modified to enable them to make slight twisting movements that control the roll of the plane without the use of ailerons and flaps. Data from this research project, based upon early twentieth-century know-how, will streamline many types of twenty-first century commercial and military aircraft.

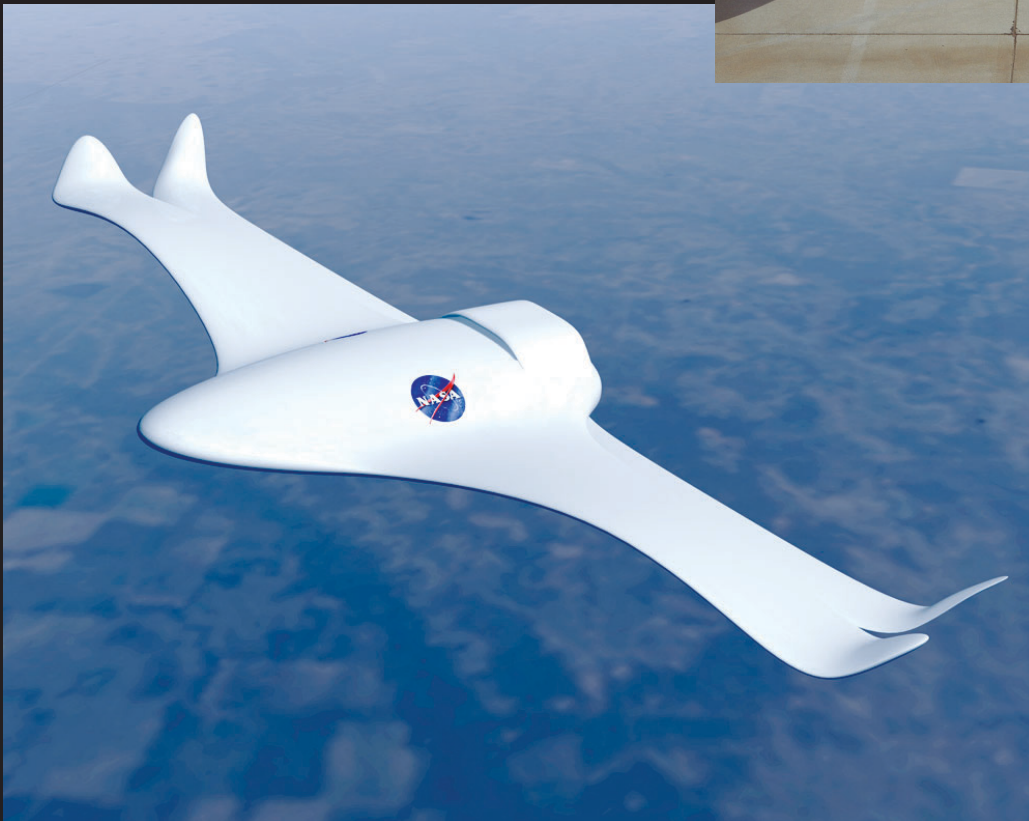
Sources: "Wing innovation takes NASA back to future," *Dayton Daily News*, March 27, 2002, Business Section, pp 1E, 6E. Photographs from the NASA Dryden Flight Research Center Photo Collection, online at <http://is2.dfrc.nasa.gov/gallery/photo/index.html>.



**This close-up of the Model A used at Simms Station in 1910 shows the wing warp that was essential for flight stability. (Wright State University Archives, Wright Brothers Collection)**



**Boeing Phantom Works modified the wings on this F/A-18 to enable them to warp. Research data from the flight test of this aircraft provides NASA and the AFRL Air Vehicles Directorate at Wright-Patterson Air Force Base with information needed to make Active Aeroelastic Wing technology practical. (NASA)**



**A NASA illustration of a possible future aircraft with active aeroelastic wings that make a tail unnecessary. (NASA)**